

**UNITED STATES DEPARTMENT OF COMMERCE****United States Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/577,166	05/24/00	SUTHERLAND	SAIC0006-US

IM22/0720

GEORGE T MARCOU  
KILPATRICK STOCKTON LLP  
SUITE 800  
700 13TH STREET NW  
WASHINGTON DC 20005

EXAMINER
ANGEBRANDT, M

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 07/20/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

**Office Action Summary**

Application No.

09/577,166

Applicant(s)

SUTHERLAND ET AL.

Examiner

Martin J Angebranndt

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on 24 May 2000 and 16 June 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 47 is/are allowed.
- 6) ☐ Claim(s) 1-43, 46 and 48 is/are rejected.
- 7) ☐ Claim(s) 44 and 45 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 and 5.
- 18) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: \_\_\_\_\_.

Art Unit: 1756

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claim 12 is rejected under 35 U.S.C. 102(b) as being fully anticipated by Eguchi et al. JP 03-188479.

Eguchi et al. JP 03-188479 teaches the contact copying of the reflection hologram where the incident beam (4) passes through the recording medium (32) and is diffracted to form beam (41) by the underlying reflection hologram (22).

4. Claim 12 is rejected under 35 U.S.C. 102(b) as being fully anticipated by Wreede et al. '118.

Wreede et al. '118 teaches the contact copying of the reflection holograms (225 and 229) where the incident beam (RB2) passes through the recording medium (235) and is diffracted to form beam (DB2) by the underlying reflection hologram.

5. Claim 22 is rejected under 35 U.S.C. 102(b) as being fully anticipated by Ikeda et al. EP 0087281.

Art Unit: 1756

Ikeda et al. EP 0087281 teaches with respect to figure 5 a master hologram, which is placed in close contact with a photosensitive layer and exposed to form a copy hologram. Figure 6 shows the formation of the diffracted beam and the passage of some of the transmitted beam, which acts as a reference beam.

6. Claims 1,10,13 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Margerum et al. '568, in view of either Eguchi et al. JP 03-188479, Wreede et al. '118 or Ikeda et al. EP 0087281.

Margerum et al. '568 teaches the use of a contact exposure through a grating mask to form diffraction gratings in PDLC recording materials. The use of a second exposure after the masked exposure is also disclosed with respect to figure 1. (5/5-57) The alternative use of a two beam holographic interference exposure is disclosed. (5/53-57, 2/27-31 and 2/54-59) The PDLC materials are coated between ITO coated glass films. (4/57-5/57). The recording of holographic patterns is emphasized. (11/33-41).

It would have been obvious to one skilled in the art to replace the grating mask used in the process of Margerum et al. '568 with the holographic gratings such as those taught by either Eguchi et al. JP 03-188479, Wreede et al. '118 or Ikeda et al. EP 0087281 with a reasonable expectation of achieving comparable results based upon the disclosed equivalent functionality within the art and further, it would have been obvious to one skilled in the art to use the lasers of either Eguchi et al. JP 03-188479, Wreede et al. '118 or Ikeda et al. EP 0087281 in place of the UV light of Margerum et al. '568 based upon the disclosed equivalent function and further a benefit of reduced effects due to poor contact would be realized as the coherence length of the laser is longer than the UV light. The examiner also notes that it would have been obvious to use

Art Unit: 1756

either a reflection hologram or a transmission hologram as the master in the appropriate orientation based upon the teachings of the secondary references.

7. Claims 1-10 and 12-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. WO98/04650, in view of Margerum et al. '568 combined with either Eguchi et al. JP 03-188479, Wreede et al. '118 or Ikeda et al. EP 0087281.

Sutherland et al. WO98/04650 teaches PDLC holographic recording media which are used to record gratings. The use of two beam exposure processes with these materials is disclosed. (8/15-30 and 9/19-33) . The compositions are disclosed as using a photopolymerizable monomer, a second phase material, a photoinitiator, a co-initiator, a chain extender (or crosslinker) and optionally a surfactant. Useful photopolymerizable materials including mixtures of di, tri, tetra and penta acrylates, such as triethylethylene glycol diacrylate, trimethylolpropane triacrylate, pentaerythritol triacrylate, pentaerythritol tetracrylate, pentaerythritol pentacrylate and the like. (10/14-27) The use of dipentaerythritol hydroxypentacrylate is disclosed. (11/12). Useful second phase materials are described as LC materials and include E7 and cyanobiphenyls (10/28-11/26 and 19/1-22/16) . Useful photoinitiators including rose Bengal esters, fluoresceins, cyanine dyes are disclosed. (11/36-12/16) Useful co-initiators including N-phenyl glycine are disclosed. (12/17-32) Useful crosslinker/chain extenders including vinyl monomers, such as N-vinyl pyrrolidone are disclosed. (12/33-13/8) Surfactants lower the operating voltage and useful surfactants include octanoic acid. (13/9-14/13). The recording media are placed between ITO coated slides as discussed on pages 15 and 11 and through application of voltage through these ITO electrodes are electrically switchable to control the birefringence and transmittance of the LC material

Art Unit: 1756

within the cured polymeric matrix. Useful amounts of the various components are disclosed on page 17. The stacking of these containing multiple gratings is disclosed on page 28 with respect to figure 17. The disclosure of these for application where holographic images are desired to be switchable is disclosed. (28/31-29/3).

It would have been obvious to replace the exposure process using two beam interferometric exposure processes of Sutherland et al. WO98/04650 with the contact exposure processes of either Eguchi et al. JP 03-188479, Wreede et al. '118 or Ikeda et al. EP 0087281 with a reasonable expectation of achieving comparable results based upon the disclosed equivalent functionality within the art and further in view of the disclosure of equivalence by Margerum et al. '568 with the advantage of simplifying the exposure set-up by eliminating the need for a beamsplitter, mirrors and other beam steering equipment.

8. Claims 32-35 and 37-40 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sturdevant '946, in view of Redfield '861, Hall et al. '326 and Amako et al. '214.

Sturdevant '946 teaches a continuous process where the holographic recording medium is preexposed without any pattern using UV light (21), Then the hologram is exposed using a laser and contact exposure through a holographic master (85) and then post exposed using a UV lamp. (91).

Redfield '861 teaches that the precure to deplete the oxygen and reduce the induction period is disclosed. (10/5-11) Similarly the fixation exposure can be carried out using the reference beam (12/1-20). The use of spatial light modulators is disclosed with respect to figure 1.

Art Unit: 1756

Hall et al. '326 teaches the use of either optically or computer generated holograms for contact copying. (10/48-50).

Amako et al. '214 teaches the generation of computer generated holograms using liquid crystal devices. (15/50-53 and 16/29-37) The replay of several holograms having different focal lengths in sequence to form the desired article is disclosed. (16/33-37).

It would have been obvious to one skilled in the art to modify the process of Sturdevant '946 by replacing the three exposure units with one exposure unit capable of performing both the interferometric exposure and the uniform exposures by replacing the holographic master used in the contact exposure with an LC device capable of recording computer generated holograms to save in equipment costs based upon the disclosure of equivalence for the use of lasers to provide the precure and fixation exposures by Redfield '861 for the same effect and the teachings of Hall et al. '326 that the use of optically produced or computer generated hologram in contact copying processes is equivalent. Further the teachings of Amako et al. '214 establish that in addition to the equivalence in functionality as a hologram the use of a computer to generate the holograms allows the holographic image of the master to be rapidly changed so that a plurality of different holographic images and copies thereof may be formed without the effort of creating an optical master.

9. Claims 1,2,9-11,22-24,32-43 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sturdevant '946, in view of Redfield '861, Hall et al. '326, Amako et al. '214 and Sutherland et al. "Bragg Gratings in an acrylate ...", Chem. Mater. Vol. 5 pp. 1533-1538 (1993).

Art Unit: 1756

Sutherland et al. "Bragg Gratings in an acrylate ....", Chem. Mater. Vol. 5 pp. 1533-1538 (1993) teaches the pre-exposure to reduce the induction period (1534/right column) and the post exposure fixation/ postcuring (1537/left column). The LCs in the hologram allow it to be switched off and on in response to the potential applied across the electrodes.

It would have been obvious to one skilled in the art to modify the process of Sturdevant '946 by replacing the three exposure units with one exposure unit capable of performing both the interferometric exposure and the uniform exposures by replacing the holographic master used in the contact exposure with an LC device capable of recording computer generated holograms to save in equipment costs based upon the disclosure of equivalence for the use of lasers to provide the precure and fixation exposures by Redfield '861 for the same effect and the teachings of Hall et al. '326 that the use of optically produced or computer generated hologram in contact copying processes is equivalent and the teachings of Amako et al. '214 establish that in addition to the equivalence in functionality as a hologram the use of a computer to generate the holograms allows the holographic image of the master to be rapidly changed so that a plurality of different holographic images and copies thereof may be formed without the effort of creating an optical master and further it would have been obvious to use the recording media of Sutherland et al. "Bragg Gratings in an acrylate ....", Chem. Mater. Vol. 5 pp. 1533-1538 (1993) to gain the benefits of being able to produce switchable holograms.

10. Claims 1-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sutherland et al. WO98/04650, in view of Margerum et al. '568 combined with either Eguchi et al. JP 03-188479, Wreede et al. '118 or Ikeda et al. EP 0087281 and further in view of Hall et al. '326 and Amako et al. '214.



Art Unit: 1756

In addition to the basis provided above, the examiner holds that it would have been obvious to one skilled in the art to modify the invention of Sutherland et al. WO98/04650, in view of Margerum et al. '568 combined with either Eguchi et al. JP 03-188479, Wreede et al. '118 or Ikeda et al. EP 0087281 by replacing the optically produced holographic masters with computer generated masters such as those disclosed by Amako et al. '214 based upon the equivalence between the two as disclosed by Hall et al. '326 with the added benefit that the image within the master hologram can be easily changed without the effort of forming an optical master.

11. Claims 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gambogi et al. '011, in view of Hall et al. '326, Kato et al. '504, Sutherland et al. WO98/04650 and Ikeda et al. EP 0087281.

Gambogi et al. '011 teaches the serial interferometric exposure of red, green and blue gratings using a mask which is shifted with respect to figures 5a-c. The photosensitive medium shown in figure 10a shows the use of a holographic master in contact copying followed by the curing step in 10b. The different holographic recording layers in figures 11, 12, 14, 22, 23 and 25 were differently sensitized to record only a single wavelength range.

Kato et al. '504 teaches the stepping of the LCD between successive exposures to record objects at different distances.

It would have been obvious to one skilled in the art to substitute the contact exposure process of Ikeda et al. EP 0087281 for that of Gambogi et al. '011 where three differently sensitized layers are present with a reasonable expectation of forming a useful transmission holographic filter and further to use a multilayered holographic master such as that taught by

Art Unit: 1756

Sutherland et al. WO98/04650 based upon the disclosure that optically or computer generated holographic masters are equally useful in contact copying processes and to use the different holographic layers to record depth/stereoscopic information as well based upon the disclosure of Kato et al. '504 that it is useful to do so.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Sutherland et al., "development of photopolymer-liquid crystal composite materials for dynamic hologram applications" SPIE Vol. 2152, pp. 303-313 (01/1994) , Sutherland, et al., "Switchable holograms in new photopolymer-liquid crystal composite materials", SPIE Vol. 2404, pp. 132-143 (02/1995), and Tondiglia, et al., "Volume holographic image storage and electro-optical readout in polymer-dispersed liquid crystal film.", Opt. Lett., Vol. 20(11) pp. 1325-1327 are cumulative to Sutherland WO98/04650.

13 Claims 44 and 45 are objected to allowable over the prior art as the prior art does not teach the switching of plural master holograms and the holographic recording layers to selectively allow recording in a second holographic recording layer of information from a second master in contact with the first master and the first holographic recording medium after recording a first hologram in the first holographic layer, but being dependant upon rejected claims.

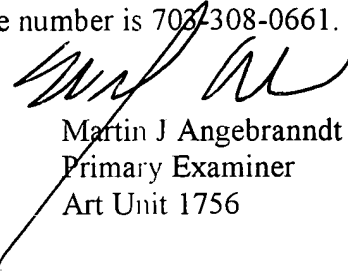
14 Claim 47 is allowable for the same reasons as provided immediately above.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J Angebrannt whose telephone number is 703-308-4397. The examiner can normally be reached on Available Mondays-Thursday and alternative Fridays.

Art Unit: 1756

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Martin J Angebrannt  
Primary Examiner  
Art Unit 1756

July 19, 2001